

Progress Report

Office of International Health Programs (EH-63), Department of Energy

Title of Project: Assembling the Cohort for Ukrainian-American Eye-Cataract Study

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Period covered by this report: 1 April 1999 – 30 September 1999

I. Summary of Work

The goal of the project is to select the cohort for the ophthalmic examinations within the scope of the Ukrainian-American Eye Cataract Study. The plan includes the selection of potential members of the studied cohort (based on dosimetric criteria), as well as contacting the selected Liquidators and inviting them to participate in the ophthalmic follow-up. It is planned that the work will be accomplished over a two-year period. During the previous three semesters 10,651 candidates for examination were selected, dosimetric information was considered, home addresses were identified and lists were forwarded to the epidemiological branch of the project. The task of the fourth quarter has been to finalize assembling of the study cohort which should include not less than 12,000 subjects.

II. Milestones and Deliverables Accomplished during the Reporting Period

Three milestones were envisaged by the Annual Work Proposal. All of those milestones were fulfilled during the reporting period. High proficiency based on the experience gained during the preceding period of work helped to streamline the process of selection, consideration and enlisting the appropriate study subjects. This allowed to make provision for assembling cohort consisting of 33,505 members, i.e. establish significant reserve for possible natural reduction of the cohort size. A short summary of the results and recent considerations are presented in the following sub-sections.

Milestone 1. Inventory and update existing reliable dosimetric information and screen for incoming individuals with doses reconstructed retrospectively.

As was described in previous progress reports, the main source of information regarding individual doses of Liquidators was the State Chernobyl Registry (SCR) of Ukraine. Other, yet relatively less powerful, sources of dosimetric data were dose reconstruction files (i.e. EPR dosimetry with teeth) and databases of individual dosimetric monitoring at time of clean-up.

However, information contained in the SCR lacks data on the affiliations of Liquidators and, therefore, individual dosimetric practices (the methods of dosimetric monitoring, measurement errors, possibility of administrative pressure and falsification of doses etc) were not retrievable from the SCR file. This fact used to raise concerns about general applicability of SCR files for the needs of UACOS. Therefore, prior to the use of SCR data, an extensive postal survey was needed in order to learn how the doses were evaluated and to identify the administrative bodies in charge of operations and dosimetric monitoring of the Liquidators at the time of the clean-up. After applying this procedure, it became possible to filter out Liquidators who belonged to the branches known for their poor dosimetric practices (i.e. early visitors to the 30-km zone) and, thus, enlist into the cataract study only those Liquidations who possessed reasonable dosimetric records. During year one of the project the described approach was essentially the primary pathway for enlisting patients to the study, yielding more than 4,000 members to the assembled cohort.

Another positive outcome of this effort was revelation of the fact that most of SCR members belonged to the categories with perhaps not very accurate but certainly not falsified dosimetric information. According to the results of postal survey, percentage of rejected subjects did not exceed 5-10%. This conclusion affirmed an extrapolation of results obtained from consideration of rather limited, yet representative cohort, to the whole SCR population and thus allowed involvement of all available SCR subjects with little (about 5%) risk of post-examination rejection.

An important source of reliable, good quality dosimetric data is presented by the results of individual dosimetric monitoring of civilian Liquidators at time of clean-up. The problem is that after the accident all dosimetric data related to the facilities of All-Union bodies (Ministries, State Committees, etc.) were transferred to Moscow. Then, after the decay of the Soviet Union, a vast amount of information happened to stay in Russia. However, with the assistance of Dr. Victor Krjuchkov (Institute of Biophysics, Moscow) and with support from Columbia University an uneasy task of retrieving individual dosimetry data was achieved and all available electronic databases were acquired and delivered to the dosimetric branch of the UACOS

However, this information has been in a raw form. As a result, upon transfer to Kiev, a vast amount of work was invested into the verification of the database records and into their linkage with the SCR. All databases had extremely variable quality from one clean-up worker to another. The most typical drawbacks of the original data were blank fields of dose and incomplete sets of identifiers. Only a small fraction of clean-up workers had unique identifiers (like passport number); in many cases, only surnames were available, and initials for the patronymic and first names.

Therefore, work for refinement of data was needed, having a final goal of standardization of information and, when possible, linkage with the SCR database. This work included several of the following steps. At first, the identifiers (i.e. fields which could be used for identification of the clean-up workers with significant degree of reliability) were selected. They were full name and year of birth. After that, selected identifiers were transformed to unified format. Only unique records of databases (i.e. records that differed in at list one of identifiers) were used for the linkage.

Eventually, this effort contributed 8,396 new dose records related to the results of individual dosimetric monitoring for 1986-1987 clean-up workers who currently reside in Ukraine. 7,142 of

them reside in the oblasts of interest and constitute a pool of candidates for ophthalmic follow-up. In fact, only 1,893 records (out of 8,396) were linked with certainty with the SCR, adding 1,613 new data entries, previously missing in the Registry. In addition, 16,097 records (out of 85,102 possessing initials instead of full names) were linked conditionally and cannot be used without further verification.

Tooth samples from the Liquidators residing in the oblasts (regions) of interest continued to accumulate. During the fourth semester, teeth from 93 Liquidators were collected in the respective regions of Ukraine, scoring the total amount of dosimetrically important samples to 713 cases.

Milestone 2. Tracing and locating the Liquidators selected from dosimetric criteria.

This milestone was basically accomplished during the 1st semester. The results of this work were explicitly discussed in the 1st and 2nd progress reports. Information on the addresses of Liquidators included into the SCR, verified during the first 12-month period, was forwarded to the epidemiological branch of the project and was used for inviting the patients to be examined.

In general, work on contacting the Liquidators had moved to the oblasts (regions) themselves and was continued by local personnel trained and assigned to examine the Liquidators.

All data files developed in course of the project and forwarded for use at oblast level contain home addresses, names of the health care bodies (hospitals/policlinics) and, when possible, telephone numbers. According to the feedback from executives at places, this information was used extensively and had proved to be adequate and useful.

Milestone 3. Enlisting patients into the study.

As expected, the 4th semester was marked by the most significant growth of the study cohort lists. This was, basically, a consequence of two reasons. First, the preparatory work which was carried out during 1-3 semesters lead to accumulation of a large amount of information, which was ultimately engaged during the 4th semester. Second, modification of the enlistment protocol which was undertaken during semester 3 (see appropriate Progress Report), allowed to expand the information basis for enlistment of the patients. Involvement of the State Registry data (which had proven not being falsified) made significant growth of the study cohort pool possible.

As was explained in previous progress reports, postal contact with Liquidators was a method of choice to enlist patients into the study during the first 12-month period. Totally, during semesters 1-4, as many as 4,348 Liquidators were engaged into the ophthalmic follow up via this pathway.

However, the results of postal survey in the 1st – 3rd semesters revealed that response rate to this type of enlistment did not exceed 40%. In addition, concerns had raised about possible enrichment of the cohort with the individuals who have eye health concerns. Therefore, it was

decided to enhance efficiency of recruitment by shifting efforts to personal contact with potential subjects at places. For this purpose, executives in oblasts were supplied with appropriate amount of mini-questionnaires and the name lists, containing personal data as described in previous sections. According to the modified protocol, enlistment of patients in oblasts was conducted by personal contacts and telephone invitations. The lists of dosimetrically approved candidates along with the most up to date personal data were used for this purpose. By the end of reporting period, the lists containing 19,443 names of Liquidators were forwarded to examination sites. As the engagement of the patients into the study is conducted on "post examination" basis (i.e. only those Liquidators who had positively responded to invitation and undergo ocular examination are considered to become a cohort members), the actual number of the patients enlisted in this was will be known from the feedback from ophthalmic practitioners.

Table 1. Summary of cohort assembling during the 4th semester

Region	Source of dosimetric information					Total
	EPR	Analytical	Dosimetric monitoring databases	State Registry (postal survey)	State Registry (candidates for contacting locally)	
Kharkiv	31	-	86	9	4957	5083
Poltava	52	-	94	51	4860	5057
Zaporizja	10	-	41	2	193	246
Donetsk	-	-	298	8	5457	5763
Dnipropetrovsk	-	-	476*	-	82	558
Kiev	-	-	6147*	-	-	6147
Total	93		7142	70	15549	22854

* By mistake, these numbers were not reflected in the report of the epidemiological branch

Table 2. Summary of cohort assembling over the whole two-year period

Region	Source of dosimetric information					Total
	EPR	Analytical	Dosimetric monitoring databases	State Registry (postal survey)	State Registry (candidates for contacting locally)	
Kharkiv	90	12	86	611	4957	5756
Poltava	133	3	94	530	4860	5620
Zaporizja	27	16	41	107	193	384
Donetsk	3	6	298	732	5457	6496
Dnipropetrovsk	14	39	476	2368	3976	6873
Kiev	446	1783	6147	-	-	8376
Total	713	1859	7142	4348	19443	33505

The breakdown of Liquidator population by the sources of dosimetric information is quite important in view of uneven quality of dosimetric data. Certainly, preference should be given to groups with highest degree of accuracy and reliability. All considered groups are assumed to be reliable (e.g. without intentional falsification), whereas uncertainties associated with dose values in particular subgroups vary. The list of groups, sorted by descending of accuracy of dose estimates is as follows:

- EPR;
- dosimetric monitoring databases;
- analytical;
- SCR (postal survey);
- SCR (no postal survey).

Practitioners in oblasts were advised to conduct recruitment of the subjects according to this criterion. As may be seen from Table 2, a total number of Liquidators in the first four (best quality) categories score 14,062 subjects. That means that even without the SCR members who did not undergo postal survey, a number of candidates for ophthalmic follow-up exceeds the required 12,000 population.

The degree of fulfillment of the instruction regarding enlistment of the patients will be summarized upon arrival and processing of the feedback from the oblast level of the project.

III. Other relevant information

The change of organizational pattern expressed in re-affiliation of cohort assembling effort from PRI to IOH allowed to facilitate daily contacts with epidemiological branch of the Project, thus

leading to streamlining the process of cohort assembling and dosimetric support of the eye-cataract study.

As referred in previous Progress report, in the framework of Ukrainian-American Leukemia Study a novel method of Soft Expert Assessment of Doses (SEAD) was developed. During the reporting period the systematic testing of the method was conducted. Three most representative categories of Liquidators were considered – professional atomic workers, military reservists (so called “partisans”), and sent on mission (short term visitors to the 30-km zone). Results of testing turned to be quite contradictory and it was suggested to introduce modifications into the method and undertake further testing in order to make final judgement regarding applicability of SEAD.

IV. Publications

1. V.V.Chumak Retrospective dosimetry of some populations exposed after Chernobyl. In: Risk Analysis: Facing the New Millenium, Proceedings of the 9th Annual Conference of Society for Risk Analysis – Europe, October 10-13 1999, Rotterdam, Ed: L.H.J.Goossens, Delft University Press, 1999 pp.894-897.